



User's Manual



TP T 15HD 45 and TP TA 45

Twisted Pair Video and Audio Transmitters

68-924-01 Rev. D
12 09

Precautions

Safety Instructions • English



This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.



This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Consignes de Sécurité • Français



Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).



Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions • Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions • Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

éviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Sicherheitsanleitungen • Deutsch



Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.



Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits- und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektronischen Sicherheit des Produktes sollten Sie aufzubewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Instrucciones de seguridad • Español



Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.



Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Consevar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean específicamente recomendados por el fabricante, ya que podrían implicar riesgos.

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (AC power plug).

Power connection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Serviceing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Avertissement

Alimentations • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'enroulez pas de la corde au contact ni de la désactivez.

Déconnexion de l'alimentation • Pour mettre hors tension le matériel, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou débranchez la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pinçés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orificios • Si le boîtier de l'appareil comporte des fentes ou des orificios, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent pas être obstruées par des objets.

Lithium-Batterie • Il existe danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät würde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromabtrennung • Um das Gerät sicher abtrennen zu können, Netzteile trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stromversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzlabels • Netzlabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengelegt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitzes und Öffnungen • Wenn das Gerät Schlitzes oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Es ist wichtig, dass diese Öffnungen nicht mit Objekten blockiert werden.

Lithium-Batterie • Explosionsgefahr, falls die Batterie nicht ersetzt wird. Entsorgen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no pertenece ni elimina.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cable de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de descarga eléctrica, no tratar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Descharcar las baterías usadas siguiendo las instrucciones del fabricante.

安全须知 • 中文



这个符号提示用户该设备用户手册中有重要的操作和维护说明。



这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

电源 • 该设备只能使用产品上标明的电源。设备必须使用有地线的供电系统供电。第三条线（地线）是安全设施，不能不用或跳过。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线，避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂的建议处理废弃电池。

声明

所使用电源为 A 级产品，在生活环境巾，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE *This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.*

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TP T 15HD 45 and TP T A 45

1

Chapter One

Introduction

Features

Introduction

Introduction

The Extron TP T 15HD 45 twisted pair transmitter and the matching TP T A 45 audio input module provide a system for sending RGBHV, RGBS, RGsB, component, composite, or S-video and stereo audio signals over an Extron Skew-Free™ A/V UTP or CAT 5/5e/6 UTP cable to a compatible TP or VTR receiver. An external 12 VDC power supply provides power to both the TP T 15HD 45 and the TP T A 45.

The TP T A 45 inputs unbalanced audio through a 3.5 mm stereo phono jack and outputs digital audio to the TP T 15HD 45 transmitter.

The following table specifies the maximum recommended transmission distances between the TP T 15HD 45 transmitter and compatible Extron receivers at 60 Hz.

The maximum recommended distances for high quality (HQ) and variable quality (VQ) transmissions are shown in the table below.

Video format and resolution	Recommended maximum range to VTR Series and TP R 15HD A		Recommended maximum range to all other Extron receivers	
	HQ	VQ	HQ	VQ
Composite*	700 feet	800 feet	1000 feet	1050 feet
S-video*	700 feet	800 feet	1000 feet	1050 feet
Component*	700 feet	800 feet	1000 feet	1050 feet
640 x 480	500 feet	550 feet	1000 feet	1050 feet
800 x 600	400 feet	450 feet	800 feet	900 feet
1024 x 768	300 feet	400 feet	600 feet	700 feet
1280 x 960	300 feet	350 feet	450 feet	600 feet
1280 x 1024	250 feet	300 feet	400 feet	500 feet
1360 x 765	250 feet	300 feet	400 feet	500 feet
1365 x 768	250 feet	300 feet	400 feet	500 feet
1366 x 768	250 feet	300 feet	400 feet	500 feet
1440 x 900	250 feet	300 feet	350 feet	450 feet
1400 x 1050	250 feet	300 feet	350 feet	450 feet
1600 x 1200	200 feet	250 feet	300 feet	400 feet
1920 x 1200	200 feet	250 feet	300 feet	400 feet

* VTR001 is not compatible with component, composite, or S-video.

NOTE *It is possible to exceed the recommended distances, however, image quality may be reduced.*

Features

- 45 mm opening compatibility — The TP T 15HD 45 and TP T A 45 are designed to fit into a 45 mm mounting frame that is popular throughout Europe. The plate may be wall-mounted or floor box-mounted.
- Extron TP product compatibility — The TP T 15HD 45 and TP T A 45 are compatible with several Extron TP receivers and matrix switchers including the TP R 15HD A, TP R BNC A, TP R BNC AV, TPX 88, TPX 88A, and the VTR series (RGBHV and RGBS only).

Introduction, cont'd



TP T 15HD 45 and TP T A 45

2

Chapter Two

Installation

Rear Panel Connectors

Front Panel Connectors and Indicators

Cabling and Setup

Installation

Rear Panel Connectors

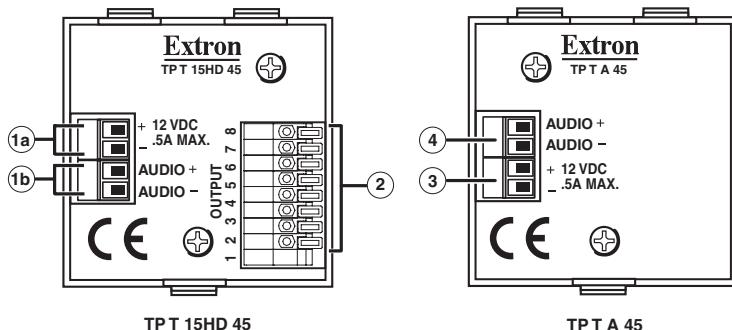


Figure 2-1 — Rear panel views

1a **Power input captive screw connector** — Connect the included 12 VDC external power supply to the 2-pole female direct insertion captive screw connector.

NOTE *The TP T 15HD 45 and the TP T A 45 share a single power supply. Neither can be remotely powered by the attached receiver.*



WARNING

The two power supply leads must be kept separated while the power supply is plugged into an electrical outlet. Remove power before wiring.

CAUTION

Power supply voltage polarity is critical. Incorrect voltage polarity can damage the power supply and the transmitter. Identify the power cord negative lead by the ridges on the side of the cord. When stripping the wire ends, please note that stripped wire ends that are too short may pull out from the captive screw connector and stripped wire ends that are too long could possibly touch and short together.

(1b)

Captive screw digital audio input connector — Connect the digital audio input cables from the TP T A 45 (if installed) to the 2-pole female direct insertion captive screw connector.



Digital Audio Input Captive Screw
Direct Insertion Connector

WARNING

Remove power before wiring.

NOTE

The wire gauge should be 14 - 22 AWG and the maximum distance between the modules should not exceed 25 feet.

(2)

Video and audio output 8-pin spring force connector —

Attach a UTP cable from a TP receiver to the 8-pin spring force connector. Wire this connector according to the following pin assignment table.

Twisted Pair Pin Assignments

Pin	Signal	TIA/EIA T-568-A Wire Color	TIA/EIA T-568-B Wire Color
1	red / vertical sync +	white-green	white-orange
2	red / vertical sync -	green	orange
3	digital audio +	white-orange	white-green
4	green +	blue	blue
5	green -	white-blue	white-blue
6	digital audio -	orange	green
7	blue / horizontal sync +	white-brown	white-brown
8	blue / horizontal sync -	brown	brown

NOTE

T-568-A is recommended when using an Extron Skew-Free™ cable.

CAUTION

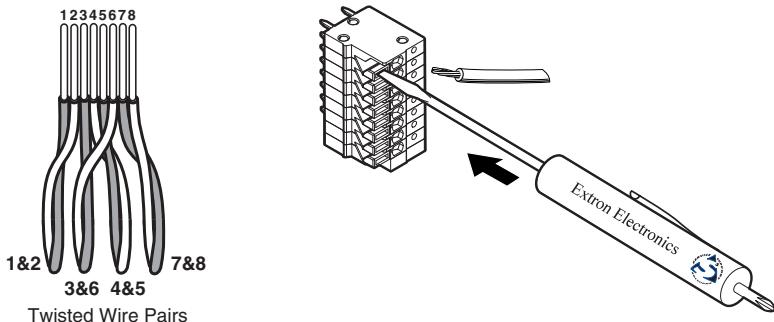
Do not connect the transmitter to a computer data or telecommunications network.

Using a small screwdriver and observing the correct wiring colors in the previous table, insert the stripped wire ends (see note below) of the twisted pairs into the spring force connector, as shown in the following diagram.

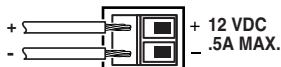
Installation

NOTE

Strip approximately 0.43 inch (1.1 cm) of insulation from each individual wire on one end of a TP cable.



③ **Power input captive screw connector** — Connect power input cables to the 2-pole female direct insertion captive screw connector.



Power Input Captive Screw
Direct Insertion Connector

WARNING

Remove power before wiring.

④ **Digital audio output captive screw connector** — Connect the digital audio output cables to the 2-pole female direct insertion captive screw connector.



Digital Audio Output
Captive Screw Direct Insertion Connector

WARNING

Remove power before wiring.

Front Panel Connectors and Indicators

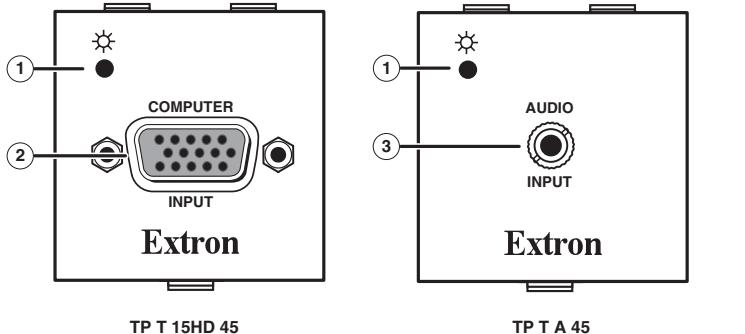
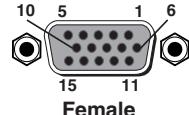


Figure 2-2 — Front panel views

- ① **Power LED indicator** — The LED lights green whenever power is applied.
- ② **15-pin HD video input connector** — Connect computer video input to this connector.



NOTE *Input only sync signals, no video signals, on the sync pins, 13 and 14.*

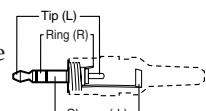
For component video, use the R (R-Y) and R return pins (pins 1 and 6), G (Y) and G return pins (pins 2 and 7), and B (B-Y) and B return pins (pins 3 and 8).

For S-video, use the R, R return (C-chroma), G, and G return (Y-luma) pins.

For composite video, use the G pin and the associated return pin. For additional genlocked video signals, use the R, B, and associated return pins.

The TP T 15HD 45 and TP T A 45 are only compatible with the RGBHV and RGBS VTR series of receivers.

- ③ **3.5 mm stereo mini jack input** — Connect unbalanced audio to this stereo jack. Wire the male plug as shown on the right.



NOTE *Input only analog and line level audio signals on this connector.*

Cabling and Setup

To install the TP T 15HD 45 and TP T A 45 models, follow these steps:

- ① Turn all of the equipment off and, if applicable, disconnect it from the power source.
- ② Connect the TP T 15HD 45 and its receiver to either end of the UTP cable. See [Cable testing](#) and [Skew delay problems](#) in this chapter.

NOTE *For best results, use Extron Skew-Free cable available in bulk or in various preterminated lengths. If necessary, regular CAT 5, CAT 5e, and CAT 6 cable may be used.*

- ③ Connect the external power supply to the TP T 15HD 45 and TP T A 45 (if installed). See [Rear Panel Connectors](#) in this chapter.
- ④ If the TP T A 45 is being installed, connect the TP T A 45 to the transmitter. See [Rear Panel Connectors](#) in this chapter.
- ⑤ Connect an output display device to the output connector of the receiver.
- ⑥ Connect a computer to the 15-pin video input connector of the transmitter.
- ⑦ Connect and power up all input and output devices, then apply power to the TP T 15HD 45 power supply and test for the display and/or audio outputs. If a problem is encountered, check all connections before proceeding further.

- ⑧ If the previous display and/or audio test was successful, power off and disconnect all equipment, detach cables, and install the TP T 15HD 45 and/or TP T A 45 modules. See [Mounting](#) in this chapter.

NOTE *If the transmitter or receiver is to be wall-mounted and the power supply will be inaccessible, power must be applied to the power supply before final mounting.*

- ⑨ Connect all device and power cables. Power up all input and output devices, apply power to the transmitter and receiver, and test for the display, the audio, or both.

Compatibility with other Extron products

As a pair, the TP T 15HD 45 and TP T A 45 are compatible with the following Extron receivers and matrix switchers:

- TP R 15HD A
- TP R BNC A, TP R BNC AV

- TPX 88A

As a stand-alone transmitter, the TP T 15HD 45 is compatible with:

- VTR001, VTR001 AAP, and VTR001 MAAP (RGBHV / RGBS only)
- TPX 88

Cable testing

To ensure proper cable termination, each transmission cable system that uses CAT 5e or CAT 6 cable should be tested (Extron Skew-Free cable does not need to be tested). Testing the cable from the transmitter and receiver gives the most accurate indications of cable problems.

There are two varieties of cable runs: simple runs, in which a single cable is terminated only at the transmitter and receiver, and complex runs, which can include patch bays and multiple terminations and lengths of cable. In either case, the entire cabling system should be tested.

A complete test measures cable length and tests the wire map, attenuation, NEXT, PSNEXT, ELFEXT, PSELFEXT, return loss, ACR and PSACR. All of these tests are critical for digital data transfer. While all of these tests are important indicators of the quality of the cable termination, the most critical testing parameters for video transfer are wire map (T-568-A or T-568-B termination) and pair length measurements. The largest concern is equalization of skew between cable pairs. Cable systems of 300 feet or less should exhibit no transmission problems if they pass at least CAT 5e or preferably CAT 6-D5 channel certification testing.

The Microtest OMNI SCANNER 2 performs comprehensive certification testing to the proposed CAT 6 standards. Other manufacturers also make testing equipment. The tests include advanced diagnostics for troubleshooting the cause and location of many cable and termination problems. For simple installation testing, the Microtest MICRO SCANNER PRO tests wire map and cable length, including individual cable pair length.

Skew delay problems

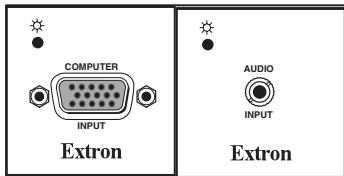
CAT 5 TP cable can lead to registration errors between the red, green, and blue video signals. Pair skew can be measured with test equipment or identified by viewing a crosshatch test pattern with a critical eye to determine if either the red, green, or blue video image leads (appears to the left of) the other two video images. These images can be minimized or eliminated by one of the following methods:

Installation, cont'd

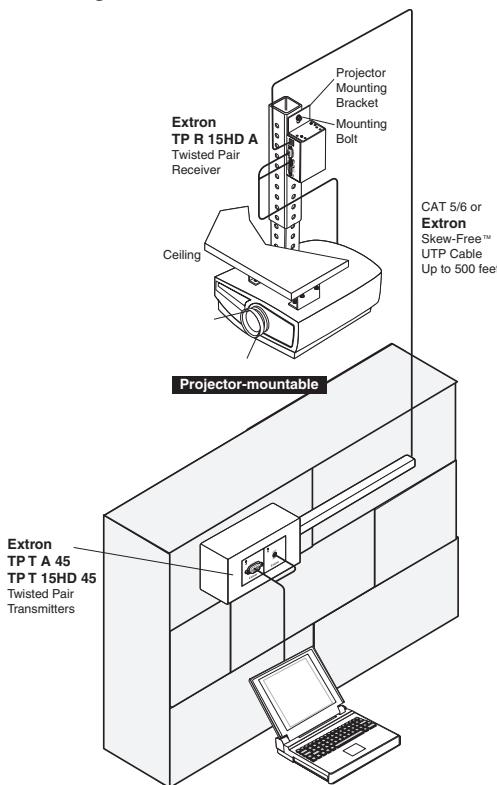
- Switch to Extron Skew-Free cable.
- Add a skew compensation cable equal to the length of pair skew to the receiver's output.
- Install an SEQ 100 15HD Skew Equalizer on the video output of the receiver and adjust the skew for the leading video image.

Mounting

The TP T 15HD 45 and TP T A 45 are designed to fit into a wall-mountable or floor box-mountable 45 mm mounting frame.



The following application diagram illustrates one example of installing these devices.





TP T 15HD 45 and TP T A 45

Appendix A

Reference Information

Specifications

Parts Lists

Reference Information

Specifications

Video— video models

Number/signal type.....	1, 2, or 4 sets of proprietary analog signals
Connectors	
TP T 15HD 45.....	(1) 8-pin spring force captive wire connector
All other models.....	1, 2, or 4 shielded RJ-45 female

Video input— video models

Number/signal type	
TP T 15HD A, TP T 15HD 45	
	1 analog RGBHV, RGBS, RGsB, component video, or S-video; or
	1 S-video and 1 NTSC/PAL/SECAM composite video from a single source; or
	3 NTSC/PAL composite video from a single source
TP T 15HD AV	1 analog RGBHV, RGBS, RGsB, component video, or S-video; or
	1 S-video and 1 NTSC/PAL/SECAM composite video from a single source; or
	3 NTSC/PAL/SECAM composite video from a single source and
	1 NTSC/PAL/SECAM composite video
TP T BNC DA4	1 analog RGBHV, RGBS, RGsB, component video, or S-video; or
	1 S-video and 1 NTSC/PAL/SECAM composite video from a single source; or
	3 NTSC/PAL/SECAM composite video from a single source

NOTE These products accept component video with bi-level sync only.

Connectors

TP T 15HD A, TP T 15HD 45	
	(1) 15-pin HD female (Mac and Sun/SGI to VGA adapters are available.)
TP T 15HD AV	(1) 15-pin HD female (Mac and Sun/SGI to VGA adapters are available.)
	1 RCA female
TP T BNC DA4	5 BNC female

Nominal level	1 Vp-p for Y of component video and S-video, and for composite video
	0.7 Vp-p for RGB and for R-Y and B-Y of component video
	0.3 Vp-p for C of S-video
Minimum/maximum levels.....	0.3 V to 1.45 Vp-p with no offset at unity gain
Impedance.....	75 ohms
Horizontal frequency.....	15 kHz to 130 kHz
Vertical frequency.....	30 Hz to 150 Hz
Return loss.....	<-30 dB @ 5 MHz
DC offset (max. allowable).....	100 mV

**Video output— refer to the TP Receivers Family User's Manual,
part #68-547-02.**

Audio — audio models

Number/signal type.....	1 or 2 sets of analog proprietary signals
Connectors	
TP T A 45.....	(1) 2-pin direct insertion captive screw connector
All other models.....	1 or 2 female RJ-45
Frequency response	20 Hz to 20 kHz, ± 0.05 dB
THD + Noise	0.03% @ 1 kHz, 0.3% @ 20 kHz at nominal level
S/N.....	>63 dB at maximum output (unweighted)
Crosstalk.....	<-80 dB @ 1 kHz, fully loaded
Stereo channel separation	>66.6 dB @ 1 kHz
CMRR.....	>33 dB @ 20 Hz to 20 kHz

Audio input — audio models

Number/signal type	
TP T 15HD A, TP T A 45...	1 stereo, unbalanced
TP T 15HD AV	2 stereo, unbalanced
Connectors	
TP T 15HD A, TP T A 45...	(1) 3.5 mm mini jack
TP T 15HD AV	(1) 3.5 mm mini jack, 2 female RCA
Impedance.....	5k ohms, unbalanced, DC coupled
Nominal level	-10 dBV (316 mV)

Reference Information, cont'd

Maximum level..... +5.5 dBu, (unbalanced) at 1%THD+N
CMRR..... >75 dB @ 20 Hz to 20 kHz

NOTE 0 dBu = 0.775 Vrms, 0 dBV = 1 Vrms, 0 dBV ≈ 2 dBu

Audio output — refer to the TP Receivers Family User's Manual, part #68-547-02.

General

Recommended cable type..... Enhanced Skew-Free™ A/V UTP Cable or
CAT 5/5E/6 (shielded or unshielded)

Power

TP T 15HD A, TP T 15HD AV

15 VDC, 0.8 A, external or provided by the
TP R receiver for up to 300'
(91.4 m)

TP T BNC DA4 15 VDC, 0.8 A, external

TP T 15HD 45 12 VDC, 1.0 A, external

TP T A 45 Shared with the TP T 15HD 45 transmitter

NOTE The TP R 15HD A receiver does not provide power to any
twisted pair transmitter.

Temperature/humidity Storage -40 to +158 °F (-40 to +70 °C) /
10% to 90%, noncondensing
Operating +32 to +122 °F (0 to +50 °C) /
10% to 90%, noncondensing

Cooling Convection, no vents

Mounting

Rack mount

TP T 15HD A, TP T 15HD AV, TP T BNC, TP T BNC DA4

Yes, with the optional TP rack shelf
mounting kit and an optional standard
rack shelf kit

Furniture mount

TP T 15HD A, TP T 15HD AV, TP T BNC DA4

Yes, with an optional under-desk or
through-desk mounting kit

TP T 15HD 45, TP T A 45

No, but mountable in a 45 mm x 45 mm
opening in common European wall boxes,
floor boxes, or cable channel systems

Enclosure type	Metal
Enclosure dimensions	
TP T 15 HD A, TP T 15 HD AV, TP T BNC DA4	
	1.3" H x 6.8" W x 4.5" D (<1U high, <half rack width)
	(3.3 cm H x 17.3 cm W x 11.4 cm D)
	(Depth excludes connectors.)
TP T 15HD 45, TP T A 45	
Plate.....	1.8" H x 1.8" W x 0.8" D (4.5 cm H x 4.5 cm W x 2.0 cm D)
Device	1.1" H x 1.6" W x 1.2" D (2.9 cm H x 4.1 cm W x 3.0 cm D) (Depth excludes front and rear panel connectors and controls.)
Product weight	
TP T 15HD A, TP T 15HD AV	0.8 lbs (0.4 kg)
TP T BNC DA4	0.9 lbs (0.4 kg)
TP T 15HD 45, TP T A 45..	0.3 lbs (0.1 kg)
Shipping weight	3 lbs (2 kg)
Vibration.....	ISTA 1A in carton (International Safe Transit Association)
Regulatory compliance (all models except TP T 15HD 45 and TP T A 45)	
Safety.....	CE, c-UL, UL
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI
MTBF.....	30,000 hours
Warranty	3 years parts and labor

NOTE All nominal levels are at $\pm 10\%$.

NOTE Specifications are subject to change without notice.

Reference Information

Included Parts

These items are included in each order for an IR 102 Remote Kit (part #70-224-01):

Included parts	Replacement part number
IR 102 Rx Remote Receiver	
IR 102 Handheld Remote Control	70-224-10
12 VDC, 1 A external power supply kit	70-055-01
IR sensor on a 6-foot cable	
RS-232 male-to-female cable, 6 feet (1.8 m)	26-433-03
IEC power cord	
Tweaker (small screwdriver)	
Hook-and-loop fasteners	
3.5 mm, 2-pole captive screw connector	10-319-15
3.5 mm, 5-pole captive screw connector	10-319-10
3.5 mm, 10-pole captive screw connector	10-319-11
User's manual	

Accessories

Accessories	Part number
1U, 3.5 inch deep, rack shelf kit	60-190-20
1U, 3.5 inch deep, basic rack shelf	60-604-20
1U, 6 inch deep, universal rack shelf kit	60-190-10
1U, 6 inch deep, basic rack shelf	60-604-10
1U, 9.5 inch deep, universal rack shelf kit	60-190-01
1U, 9.5 inch deep, basic rack shelf	60-604-01
Mini under-desk mounting bracket kit	70-212-01
Multi-product projector mounting kit	70-374-01
1/4 rack width mini projector mounting kit	70-217-01

Reference Information

Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

**USA, Canada, South America,
and Central America:**

Extron USA
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Japan:

Extron Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe, Africa, and the Middle East:

Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:

Extron China
686 Ronghua Road,
Songjiang District
Shanghai 201611
China

Asia:

Extron Asia
135 Joo Seng Road #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Middle East:

Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Extron USA - West	Extron USA - East	Extron Europe	Extron Asia	Extron Japan	Extron China	Extron Middle East
Headquarters +800.633.9876 Inside USA / Canada Only +1.714.491.1500 +1.714.491.1517 FAX	+800.632.0976 Inside USA / Canada Only +1.919.863.1794 +1.919.863.1797 FAX	+800.3987.6673 Inside Europe Only +31.33.453.4040 +31.33.453.4050 FAX	+800.7338.8766 Inside Asia Only +65.6383.4400 +65.6383.4664 FAX	+81.3.3511.7655 +81.3.3511.7656 FAX	+400.882.1568 Inside China Only +86.21.3760.1568 +86.21.3760.1566 FAX	+971.4.2991800 +971.4.2991880 FAX